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U. S. DEPARTMENT OF AGRICULTURE  
Office of Information  
Press Service



WASHINGTON, D. C.

RELEASE FOR PUBLICATION  
JUNE 3, 1936 (WEDNESDAY)

THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

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COOKING WITH MILK AND CHEESE

With markets and gardens offering almost everything in the way of summer vegetables, there is choice enough to satisfy the most careful housekeeper as well as the most capricious appetite. But to provide a good meal, even with the best of planning, means more than knowing<sup>g</sup> how to choose from the season's best. It means that somebody in the household must know how to cook.

Vegetable cookery, however, involves other foods. For greater variety in flavor and texture, we cook vegetables in different ways and in many combinations with other kinds of products -- sometimes not for variety alone, but for economy and often to increase the nutritive content of the meal. Here, says the Bureau of Home Economics of the U. S. Department of Agriculture, is where milk and cheese come in. They supplement the food values of vegetables, and at the same time give a new character to many a vegetable dish.

But before we can have cream vegetable soups, creamed or scalloped vegetables, or for that matter, such all-year standbys as macaroni or rice and cheese, we must know how to cook milk and cheese.

The basic rule for cooking protein foods -- and that means not only milk and cheese but meat, fish, poultry and eggs -- is to cook them at low or moderate



temperature, because protein coagulates, hardens, and finally toughens under high temperature and prolonged heating. But there are many proteins and those in milk create special problems for the cook, because of the differing principles of cookery that apply to the proteins, the starches, and the succulent, more or less acid foods with which milk is so often combined.

Most troublesome is the curdling or "separating" of milk when heated in combination with certain other foods. One of the milk proteins is casein, which is precipitated in curds when the milk is heated in a mixture containing even a little acid. Most vegetables contain some acid. Asparagus, string beans, carrots, and peas, for example, are not cooked in plain milk for this reason. To make cream-of-tomato soup, special precautions are needed.

The usual answer to this problem of curdling is to thicken the milk -- or in other words, make it into a white sauce before combining it with the vegetables. The starch in the flour used for thickening prevents curdling by holding the casein in suspension in the liquid, as the chemists say. The thickened milk can be combined with the vegetable without curdling, provided the mixture is not heated too long and is served immediately. If allowed to stand it will curdle.

For cream-of-tomato soup the best results are obtained by applying the thickened milk principle in reverse so to speak -- that is, thicken the tomato juice and add it to the cold milk. Neutralizing the acid in the tomato juice by means of soda is another method sometimes used, but the soda injures the flavor and tends to destroy the vitamin content of the tomatoes.

Curdling must be guarded against in making chocolate, which contains some acid, and in making rice pudding, especially if there are raisins in the pudding. In either case, cook at the lowest possible temperature.



Another effect of heating milk is the skin that forms on the surface of the milk and on the sides of the pan almost as soon as it is put over the fire. This skin is not attractive, but it should not be discarded because it contains important food values. The best way to prevent it is to stir the milk as it heats, or beat it afterward with an egg beater. Hot cocoa or chocolate, for example, is more inviting if well beaten before serving.

When it comes to vegetable dishes containing milk and eggs, both curdling and another kind of protein behavior -- shrinkage and toughening -- must be prevented. Again the milk is thickened. The basis of a vegetable or a fruit soufflé -- or any soufflé -- is white sauce and eggs. To the white sauce are added first the egg yolks; then the finely divided vegetable or fruit or cheese, or other flavorings; then the egg white beaten to a foam. Although thickening of the milk prevents curdling due to any acid that may be present, cooking at too high a temperature or too long a time causes the proteins in the mixture to shrink and toughen, contracting the foamy structure, releasing the air and causing the soufflé to "fall".

Sometimes, of course, curdling is desired -- as in making cottage cheese. Sour milk, or milk that has just begun to turn, though not sour to the taste, will curdle if heated. Gentle heating, up to lukewarm temperature (about 104 degrees Fahrenheit), will separate the curds of casein from the whey, and when the whey is strained off the product is what we call cottage cheese. Too much heat, however, for too long a time, makes dry, tough, and rubbery cheese.

Cheese dishes -- made with such solid cheeses as American cheddar -- are always mixtures of cheese with something else. Usually the method is to add the cheese to a white sauce, which is then combined with the other ingredients.





Or, if the cheese is dry and hard, like Parmesan, it is grated and served, Italian fashion, on a separate dish, to be sprinkled over soup, or macaroni, or vegetables. In other words, cheese is such a concentrated food that we can not take much of it "straight". Cooking with cheese, a milk product, involves the milk proteins and the cooking problems those proteins create. Cheese in fact, should not be really cooked, but merely heated enough to melt it. Overheating toughens and hardens cheese, and may cause a cheese mixture to "separate" -- as witness many a welsh rabbit.

All the typical cheese dishes illustrate these principles. For macaroni and cheese, and all the vegetable dishes with cheese, the rules are to make a white sauce, add grated cheese to this sauce, and heat the mixture only until the cheese is melted. Combine this sauce, now a cheese sauce, with cooked macaroni, cooked rice, cooked potatoes or other vegetable, to avoid cooking the cheese again. Heat this mixture through, and, if an oven dish, brown it. But do not heat it longer than necessary for these purposes, else it will separate.

In welsh rabbits, where cheese itself is the main ingredient, a double boiler or a chafing dish is needed to keep the heat low, and cooking should stop when the cheese is melted and the ingredients well blended. When cheese is combined with eggs, in omelet, soufflé or rabbit, the rule of low temperature and short cooking time applies to all the proteins and with added emphasis.





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THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

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EGG COOKERY

Hens are laying well this spring -- better than last year at this time, according to reports to the U. S. Department of Agriculture, although the season did not begin so early because of cold weather. On May 1 the average production of farm flocks the country over was more than 56 eggs per 100 hens, and as there are more laying hens this year, the total egg production on that date was 4 per cent greater than a year ago.

Egg production, say poultry specialists of the U. S. Department of Agriculture, depends not only upon the breeding of the hens but upon their feed and the amount of sunshine they get. Feed and sunshine are so important that nowadays, on the up-to-date commercial poultry farms the hens get cod-liver oil as regularly as if they were children. The cod-liver oil is mixed with their "mash", in prescribed amounts. According to scientists of the Bureau of Animal Industry, hens need vitamin D for good laying capacity, and they get this vitamin both from sunshine and from cod-liver oil. At the same time, the cod-liver oil in the hens' feed, and the sunshine they get, increase the vitamin D content of the eggs, which is important especially in the diet of children.

Eggs, however, are one of the foods that are nearly always cooked -- either for themselves along or in "made dishes" with other foods. And their characteristics



are so different in many ways, their uses so numerous and varied, that egg cookery is almost an art in itself. Eggs are used to add food value to other dishes, to enrich the flavor and to change the texture and appearance. They thicken sauces and custards, they lighten quick breads and cakes, the whites give delicacy to frostings and candies, and are made into meringues. In fact, any cook feels seriously handicapped if she doesn't have eggs to cook with. But she does have to know how to use them.

The first principle of egg cookery, as in cooking other protein foods, says the Bureau of Home Economics of the U. S. Department of Agriculture, is to use as little heat as possible. The egg proteins begin to coagulate as soon as heated, even a little, and they harden with too much heat. So the rule for cooking eggs is simmering temperature, not boiling, if they are cooked in water. For poaching, break the eggs into boiling salted water to cover, in a shallow pan, then turn off the heat or set the pan off the fire -- but cover it and let it stand until the eggs are delicately firm, or soft-cooked. Eggs cooked in the shells are best if started in cold water to cover, and heated to the simmering point, then allowed to stand covered for a few minutes, and taken off the fire. Or they can be dropped into boiling water, covered, and removed from the heat to stand for a few minutes, as in poaching.

When it comes to omelets, there are many variations. The simplest is the French, or flat omelet, which consists of eggs, a little milk or water, and seasonings as desired. The eggs are beaten, white and yolk together, until well mixed, then cooked on top of the stove over low heat to a jelly-like consistency. Scrambled eggs are this same mixture stirred while cooking.

A fluffy omelet is made by separating the yolks and whites, adding milk or water and seasoning to the yolks, beating the whites to a stiff foam, and folding this foam into the yolk mixture. In all these cases the liquid, milk or water,





is added so the eggs will stand more heat before coagulating, and so that the proteins, when cooked, will be more tender. But omelets of any kind should cook slowly to allow them to "set" without "falling", and they should be served immediately and on a hot plate.

Among the omelet variations is the "white-sauce omelet", which consists of white sauce -- about 1/4 cup to each egg -- combined with the yolks and the well-beaten whites folded in. This makes a tender omelet and calls for fewer eggs than does the plain or fluffy omelet.

Souffles, as they are called when flavored with vegetables, ground meats, flaked fish, or grated cheese, and with some fruits, are white-sauce omelets baked. Or they may be thickened with bread crumbs instead of white sauce, depending upon the consistency of the vegetable or other flavoring.

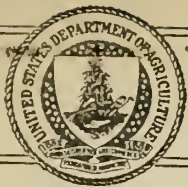
Fruit whips may be made with the whole eggs, but if the fruit pulp is thick -- as in prune or apricot whip -- only the beaten egg white is used. The fruit is heated to dissolve the added sugar, and while hot is combined with the egg white, thus cooking the latter a little. If the whip is baked, the oven should be very low, and the dish should be in a pan of water.

Sponge cakes, according to the scientific cooks, are really a development of omelets and souffles. The ingredients are flour, eggs, sugar and salt, with flavoring and lemon juice, cream of tartar or other acid. No fat, and no baking powder or other leavening. The eggs when beaten take up air which leavens the mixture, and the acid makes the cake more tender by slowing down the coagulation of the proteins as the cake is baked. The yellow sponge cake is essentially a fluffy omelet mixture thickened with flour, sweetened and flavored and baked in a cake pan. Angel food is essentially a meringue thickened with flour. As egg mixtures, all sponge cakes must be cooked just as slowly as possible.

Custards, too -- which contain only eggs and milk, with sugar and other flavoring, and are therefore essentially a combination of two protein foods -- should be cooked very slowly, soft custards over water, baked custards in a dish surrounded by water.







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THE MARKET BASKET

by

Bureau of Home Economics, U. S. Department of Agriculture

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MEAT COOKERY - THE SHRINKAGE PROBLEM

With beef a good buy in the meat markets nowadays, beef cookery is again a timely subject for consideration. Whether it is roast, steak, or cold cuts that come to the table, somebody has to deal with the problem of shrinkage when meat is cooked. A plump or juicy roast or steak, "done" to the right degree, is what the cook tries for. But she is dealing with a protein food, where cooking temperature is all important. Too much heat -- that is, temperature too high, or cooking time too long, either or both -- shrinks the meat and hardens it as it does all protein foods. So the oven temperature must be carefully controlled.

Then there are variations in the method of roasting beef -- two schools of thought especially on whether to brown the meat or not to brown it at the start. So the Bureau of Home Economics of the U. S. Department of Agriculture has tested different methods and different temperatures and cooking times, and has compared the results as to shrinkage, appearance, proportion of rare and well-done servings, and palatability in general.

The roasts selected for the tests were prime ribs of beef, all weighing the same at the start, 12-1/4 pounds. All were placed fat-side up in uncovered pans, with no water added, and were cooked in a ventilated, uninsulated gas oven.



Before the roasts were put in the oven, a meat thermometer was inserted in each until the thermometer bulb was in the center of the meat. Cooking was continued until the roast was rare at the center, at which time the meat thermometer registered 140 degrees F. Then the cooked roast was weighed to determine the amount of shrinkage. The drippings in the pan, which also were weighed, represented a part of the loss in weight of the roast. The rest of the loss was accounted for by evaporation.

In the first method, the roast was cooked in a hot oven (450 degrees F.) from start to finish; in the second, in a slow oven (250 degrees F.) from start to finish; in the third, started at high temperature (500 degrees F.), but finished slowly, at 300 degrees F. -- in other words, this roast was browned on the outside to begin with. By the fourth method, the roast was cooked at moderate temperature (350 degrees F.) from start to finish.

As to shrinkage, here are the results: Although the roasts all weighed the same (12-1/4 pounds) before cooking, the one cooked in a hot oven shrank to 8-1/4 pounds, the one in the slow oven shrank only to 10-3/4 pounds, and the other two shrank only a little more -- they weighed 10 and 10-1/4 pounds cooked.

High shrinkage is only one of the effects of high temperature and prolonged cooking of meat. The flavor and the texture -- in other words, the palatability -- depends upon controlling oven temperature and cooking time. There is also the item of fuel consumed to cook the meat.

Roast No. 1, cooked in a hot oven the entire time, was not only shrunken but scorched. It was rare only at the center, most of it was well-done. The drippings, which weighed 2 pounds, were scorched and unfit for gravy. This roast was in the oven 3 hours, and the gas consumed to cook it amounted to 95 cubic feet.

Roast No. 2, cooked at low temperature the entire time, was very plump when done, but the outside fat was not crisp. The lean parts were pink and rare to the

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very edge; the drippings, which weighed only 1/2 pound, were almost pure fat, very pale, and would not give much flavor to gravy. This roast was in the oven 5 hours, and the amount of gas consumed was 63 cubic feet.

Roast No. 3, browned at high temperature but finished slowly, was plump and had a crisp brown crust. Most of it was rare, and the drippings, in color and flavor, were just right for good gravy. The cooking time was 4 hours, gas consumption 74 cubic feet. This roast was considered a happy medium between the other two.

Roast No. 4 was cooked at moderate temperature the entire time (350°/degrees F.), with results and gas consumption much the same as in the third case, although the outside fat of this roast was not as crisp as in Roast 3, which was browned at the start. But here, too, was a happy medium product. And the gas consumed was 77 cubic feet.

Obviously the choice of methods here, based on amount of shrinkage as well as palatability of the meat, lies between Roast No. 3, which was first browned, then cooked at moderate temperature, and Roast No. 4, which was cooked at constant moderate temperature without initial browning. But that choice may depend upon the kind of stove in which the meat is to be roasted. With a modern gas oven, with thermometer and mechanical heat control, the method used for Roast No. 3 is easy because the high temperature needed for browning can be lowered quickly to the moderate temperature required for finishing the roast. With other fuel, the quick lowering of temperature is harder, though it can be done by opening the oven door for a few minutes to reduce the heat. Unless the heat can be quickly reduced after browning the meat, a constant moderate temperature is best.

So far, however, we have considered only the roast that is cooked rare. Some of the family doubtless prefer their roast beef medium, some would have it well-done. To provide more medium or well-done servings, the roast must stay in the oven a longer time than if rare meat only is desired. So there we have the





shrinkage problem again, and the only thing to do is to minimize it by controlling the temperature. Flavor and texture suffer, too, with overcooking. The Bureau of Home Economics sums up its recommendations thus:

Place the roast fat-side up in the pan -- so it will baste itself. Leave the pan uncovered and do not add water -- or else the result is a pot-roast.

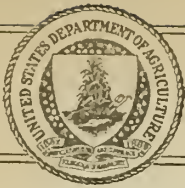
If the roast is to be browned at the start, count on 20 to 30 minutes in a hot oven (500 degrees F.) for this purpose, then reduce the oven temperature at once to moderate heat (300 degrees F.), and continue cooking until the desired stage of "doneness" is reached. The cooking time, including the time for initial browning, is about 16 minutes per pound to cook the meat rare; 22 minutes per pound to cook it to medium, and about 30 minutes to the pound to cook it well-done. The meat thermometer registers, at the center of the meat, a temperature of 140 degrees for rare, 160 degrees for medium, and 180 degrees for a well-done roast.

If the roast is not browned first, the oven should be moderate all the time, though a little hotter than required to finish a roast that has been browned. That is to say, a temperature of about 350 degrees from start to finish by this method.

Not only roasts, but steaks and chops and all other cuts of meat of any kind, shrink some in cooking. The fat melts and with it come the juices squeezed out by the shrinkage of the meat proteins. Slow cooking minimizes this. Even the browning part of the process is no exception to the rule of slow cooking for meat, because it is only a quick browning of the surface to give flavor.







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THE MARKET BASKET  
by

Bureau of Home Economics, U. S. Department of Agriculture

CURED MEATS AND HOW TO COOK THEM

Summer is the big season for cured meats. We use them all the year round, but the summer demand is greater---perhaps because the flavor is more tempting to hot-weather appetites, certainly because cured meats keep better than fresh, and also, no doubt, because they make such good cold cuts. Whatever the reason, meat specialists tell us that much of the pork killed and dressed in winter is so processed as to be just ready "to come out of smoke" when summer comes.

Most of our cured meat is pork--ham, shoulder butt, bacon, Canadian bacon, salt pork, and some sausages. But we have corned beef and dried beef, and various sausages that are made of beef and pork. Lamb and mutton are sometimes cured, but have never become popular.

The two most common curing processes are "sweet pickling" and dry-salting. For sweet pickling the meat is put in brine which contains sugar, and is kept there for a period of about 4 days to the pound of meat, or 60 days for a 15-pound ham. The brine preserves, and the sugar, along with changes developed in the meat itself, gives flavor. Usually a little saltpeter is added to keep the red color. The dry-salt method is to rub salt and molasses, or salt and sugar sirup, and a little saltpeter into the surfaces of the meat and pack the pieces

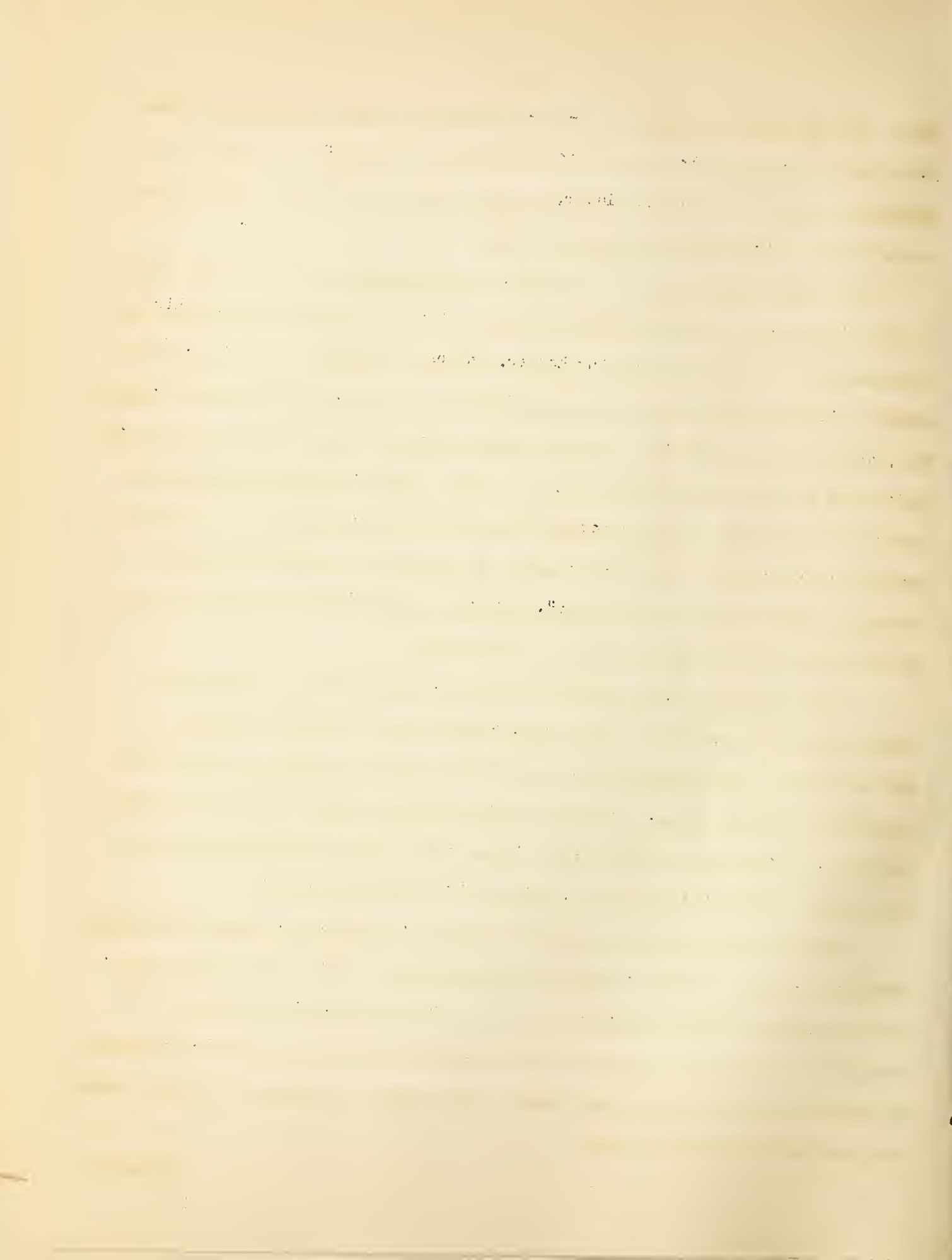


away. For this cure only about 2 days to the pound of meat is necessary. Most cured meat is also smoked, to add flavor, and for this purpose it is put in a smokehouse with a fire of green hickory or maple wood--not pine or other resinous woods because they give an undesirable flavor.

The "sugar-cured" ham of the markets is sweet-pickled ("S.P.") ham. This is the usual method in the big packing houses, and on the farms in the North. "Old Virginia ham", or just "old ham" is quite a different product. It is dry-cured, smoked, and aged or "ripened" at room temperature for a year, or preferably longer. The little town of Smithfield, Virginia, made such hams famous many years ago, and one of the big meat packing firms now has a plant there turning out "Smithfield hams" as a specialty. Only the product actually cured in Smithfield is legally entitled to the name of "Smithfield ham". But anywhere in Virginia, Maryland, Kentucky, North Carolina and the South generally, hams cured the Smithfield way are to be had under the name, usually, of "old ham".

Pork shoulders, bacon, corned beef, and dried beef are all cured and smoked in much the same way as the "sugar-cured" ham. Salt pork, however, is dry salted and is not smoked. And dried beef is dried in addition to the curing and smoking. Smoked sausage is only lightly cured and lightly smoked, and should be kept in a refrigerator until used. Some of the "summer sausages" which are dried after curing will keep for a long time in a cool dry place.

Fresh or cured, however, pork must always be cooked--and cooked thoroughly. Corned beef, too, is cooked, though dried beef often is not. And in all cases, says the Bureau of Home Economics of the U. S. Department of Agriculture, the cooking of cured meat is subject to the same general rule that governs the cooking of all meat and all other protein foods. Cook slowly. Otherwise the meat shrinks too much and gets hard and tough.





But there are certain other requirements in the cooking of cured meat--ham for example. Usually ham that is to be baked should be soaked beforehand, or else parboiled, to get rid of the too-salty taste.

"Boiled ham" properly cooked, however, never is actually boiled. It is simmered, in water fully to cover it all the time, and with the lid partly on the kettle. The water should never reach the boiling point. Let it simmer for 25 or 30 minutes to the pound of ham, or until the meat is tender, says the Bureau of Home Economics. And cool the ham in the liquor.

To bake ham, use the same rule of slow cooking. First, however, soak the ham overnight. In the morning wipe it dry, and place it, rind-side up, on a rack in an open pan--no water, and no cover. Keep the oven low (260 degrees F.). Baking as well as "boiling" requires 25 to 30 minutes per pound for a whole ham. For half hams, proportionately more time is necessary. Shank ends usually require from 40 to 45 minutes per pound, and butts from 45 to 55 minutes per pound to bake when the oven temperature is 260 degrees F.

The final touches give a baked ham an unusually tempting appearance. When the ham is done take the rind off and spread over the fat surface a mixture of brown sugar and fine soft breadcrumbs, with a little prepared mustard and cider or vinegar for moistening. With this paste covering the ham, stick long-stemmed cloves an inch or so apart all over it. Or else score the fat with a knife, sprinkle with brown sugar and add thin slices of pineapple, or orange, with occasional preserved cherries or other decorative fruit. Then brown the coated ham in a hot oven (500 degree F.) for about 10 minutes.

A meat thermometer is a great convenience in cooking ham, or any large piece of meat, because it insures cooking to the right degree of "doneness" without overcooking and waste of fuel. Thrust a slender knife into the thickest part of the ham and then insert the thermometer so the bulb is in the center of the



meat. Leave the thermometer in place throughout the cooking. When it registers 170 degrees F. the ham is "done" all through.

Pork, fresh or cured, should be tender because, as a rule, it comes from a young animal. If it is not tender when cooked, the reason may be that it was cooked too quickly, or that it was from an old animal. Hams from pigs of the usual market age--a year or less--should always be at least moderately tender if well cooked.

Bacon should be cooked slowly for two reasons--to avoid toughening the strips of lean it contains and to avoid overheating the fat and thereby spoiling its flavor. Corned beef should be cooked--that is, simmered--in plenty of water, changing the water, if necessary, to keep the meat from being too salty.

Frankfurters, so popular for picnic purposes and so familiar as "hot dogs", are made of beef and pork--often, too, with cereal of some kind as a "binder". Government graded sausages, however, which are nowadays featured by many dealers, are all meat. Frankfurters are popular hot--simmered in a little water until thoroughly heated, or grilled, or toasted on a stick over a picnic fire. Bologna, which also is made of beef and pork, though differently seasoned, is usually sliced and served cold.

